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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MINNIFIELD, NITA M	

ART UNIT	PAPER NUMBER
1645	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/789,536	KRIEG ET AL.	
	Examiner	Art Unit	
	N. M. Minnifield	1645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *37 and 39-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37 and 39-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' amendment filed January 11, 2006 is acknowledged and has been accepted. Claims 1-36 and 38 have been canceled. Claims 37, 39 and 54 have been amended. Claims 37 and 39-56 are pending in the instant application. All rejections have been withdrawn in view of Applicants' comments/arguments, with the exception of those discussed below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 37 and 39-56 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of administering CpG to a subject (mice), does not reasonably provide enablement for a method for stimulating a subject's response to a vaccine comprising administering an immunostimulatory oligonucleotide adjuvant as a vaccine adjuvant to the subject to stimulate the subject's response to the vaccine. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The presently pending claims are not clear with regard to the intended use as well as the steps comprising the claimed method. For example, it is not clear if the composition being administered to the subject comprises the immuno-stimulatory oligonucleotide or the immunostimulatory oligonucleotide and a vaccine antigen? Is the CpG administered before the vaccine antigen? What does Applicant intend for the recitation of "response to a vaccine"? It is not clear if

response means stimulating an immune response or stimulating a vaccine to protect the subject against infection. A review of the specification does not answer these questions and in view of these questions, the specification is not enabled for the scope of the claimed invention.

Example 5 of the specification teaches in vivo studies with CpG phosphorothioate ODN. "Mice were weighed and injected IP with 0.25ml of sterile PBS or the indicated phosphorothioate ODN dissolved in PBS. Twenty four hours later, spleen cells were harvested, washed, and stained for flow cytometry using phycoerythrin conjugated 6B2 to gate on B cells in conjunction with biotin conjugated anti Ly-6A/E or anti-Ia^d (Pharmingen San Diego, CA) or anti-Bla-1 (Hardy, R. R. et al., J. Exp. Med. 159:1169 (1984). Two mice were studied for each condition and analyzed individually." (specification, p. 27)

It is not clear if this study was actually done. The methods and steps have been set forth, but data indicating the results of this study are not disclosed in this specification. There does not appear to be any example set forth of administering a vaccine composition (i.e. antigen and CpG) to a subject and the resultant stimulating a subject's response to a vaccine.

The scope of the recitation "vaccine" is broad and the claims do not specifically define a particular vaccine or antigen for the vaccine. Does applicant intend this method to be applied to each and every vaccine composition (i.e. viral, bacterial, fungal, protozoal, cancer, etc)? The specification at p. 7 indicates that the immunostimulatory oligonucleotides can be used to treat, prevent or ameliorate an immune system deficiency (e.g. tumor or cancer or a viral, fungal, bacterial or parasitic infection) in a subject; and that the CpG can be administered as a vaccine adjuvant to stimulate a response to a vaccine. As previously stated, the

specification does not set forth enablement for the scope of the claimed invention, or for the statements in the specification regarding treatment, prevention or amelioration.

The state of the art regarding the use and function of immunostimulatory oligonucleotides is unpredictable. At the time the pending patent application was filed, 1995, the state of the art was unpredictable regarding the immuno-stimulatory oligonucelotides (CpG) and its use as an adjuvant, immunopotentiator, or as a compound alone to treat, prevent or ameliorate an immune system deficiency (e.g. tumor or cancer or a viral, fungal, bacterial or parasitic infection) in a subject. Threadgill et al 1998 teaches that oligonucleotides containing stimulatory unmethylated CpG dinucleotides may not be useful adjuvants when given simultaneously with bacterial PS vaccines (abstract). The oligonucleotide would not be useful in a method of stimulating a response in a subject to a bacterial vaccine. Polysaccharide-specific antibody levels were reduced in mice coadministered CpG and high-MW PS as compared to mice administered high-MW PS with NSCpG oligo or PS alone without an adjuvant (p. 80). Threadgill et al states that based on in vitro and short term in vivo experiments, some investigators have suggested that oligonucleotides containing CpG motifs could be used as adjuvants for inducing an improved immune response to normally poor immunogens (p. 77). However, Threadgill et al, in 1998, states that more experimentation in animals should provide the information necessary to evaluate more fully the potential of CpG oligos as a vaccine adjuvant (p. 81).

The state of the art after the filing date of the claimed invention appears to indicate that CpG functions as an adjuvant in some viral compositions (see for example Gallichan et al, 2001 and Harandi et al, 2004). However, the state of the

art at the time of the invention did not indicate or suggest the use of a vaccine composition comprising CpG or CpG alone in the scope of the methods presently claimed. Further, there are numerous possible immunostimulatory oligonucleotide sequences within the scope of the claimed CpG and it is not clear that each one would function as claimed.

Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized in In re Wands, 858 F.2d 731, 8USPQ2d 1400 (Fed. Cir. 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Regarding points 1-3, the pending specification does not provide sufficient evidence of a working example and as a result this would require undue experimentation for the person of skill in the art to practice the claimed invention. The state of the art, the unpredictability of the art and the scope of the invention have been discussed above. In view of all of the above, it would require undue experimentation for the skilled artisan to practice the claimed invention.

The rejection is maintained for the reasons of record. Applicant's arguments filed ***July 11, 2005*** have been fully considered but they are not persuasive. Applicants have asserted that there are over "300 oligonucleotides that contained methylated, unmethylated, or no CpG dinucleotides in various sequence contexts were synthesized and examined for in vitro effects on spleen cells (representative sequences are listed in Table 1). These and many other working examples are presented in the specification. In particular the cumulative data strongly supports the use of CpG oligonucleotides as adjuvants. For instance the following data is relevant on B cell activation, IL-6 and IL-12 induction..." (see p. 7 of remarks).

However, it is noted that only Example 6 of the instant invention is an in vitro study that looks at B cell stimulation (see p. 27). Example 8 of the instant specification concerns in vivo induction of IL-6; CpG was the only component administered to the mice (see p. 27). The claims are directed to methods for stimulating a subjects response to a vaccine comprising administering an immunostimulatory oligonucleotide adjuvant and a vaccine. Example 8 only administers the oligonucleotide; this does not appear to be of the same scope as the claimed method. Applicants have asserted that they were the first to discover that CpG oligonucleotides promote an antigen specific immune response, and are thus useful as vaccine adjuvants. However, none of the examples set forth in the specification enable this concept of administering the CpG and antigen as a vaccine composition to promote an antigen specific immune response. Further, the claims merely recite "subjects response to a vaccine"; does Applicant intend this to mean an immune response or protection?

Applicants have cited several references (i.e. Cooper et al, 2004; Chu et al, 2000; Hunter et al, 2001; Lefeber et al, 2003; Von Hunolstein et al, 2000; and Mariotti et al, 2002) on pages 8-10 of the July 11, 2005 amendment. It is noted that all of these references were published after the effective filing date, 1994, of the instant application. The references were published post filing. Applicants' claimed invention must be enabled at the time of filing. It is noted that the specification describes the steps of the claimed method to one skilled in the art, but does not provide any evidence that any of the claimed methods would function *in vivo* or *in vitro*. The issue of correlation is related to the issue of the presence or absence of working examples. Correlation as used herein refers to the relationship between *in vitro* or *in vivo* animal model assays and disclosed or a claimed method of use. An *in vitro* or *in vivo* animal model example in the specification, in effect, constitutes a working example, if that example correlates with a disclosed or claimed method invention. If there is no correlation, then the examples do not constitute working examples. (see MPEP 2164.02) The pending specification does not set forth such correlations for a working example of the claimed *in vivo* method. Further, the specification would have been enabling as of the filing date involves consideration of the nature of the invention, the state of the prior art and the level of skill in the art. The state of the art is what one skilled in the art would have known, at the time the application was filed, about the subject matter to which the claimed invention pertains. The relative skill of those in the art refers to the skill of those in the art in relation to the subject matter to which the claimed invention pertains at the time the application was filed. The specification must be enabling as of the filing date, not evidence provided several years after the date of

filing. The state of the art for a given technology is not static in time. It is entirely possible that a disclosure filed on January 2, 1990, would not have been enabled. However, if the same disclosure had been filed on January 2, 1996, it might have enabled the claims. Therefore, the state of the prior art must be evaluated for each application based on its filing date. (see MPEP 2164.05(a))

It is also noted that none of the claims recite a specific dosage of CpG or an effective amount for any purpose. The claims recite "stimulating a subjects response to a vaccine"; does this necessarily mean an immune response or protective immune response? It is also noted that the claims as written could also encompass administration of DNA vaccines; which the instant specification does not enable.

Further, biological responses to the administration of CpG containing oligonucleotides vary, however, depending on the mode of administration and the organism (see McCluskie et al Molecular Med., 1999, 5/5:287-300 in its entirety, and especially on p. 296; see Krieg et al, Immunology Today, 2000, 21/10:521-526, especially p. 524). Wohlleben et al 2001 (TRENDS in Immunology, 2001, 22/11:618-626) studied the effects of CpG on atopic disorders such as allergic asthma. CpG-ODNs have multiple stimulatory effects on lymphocytes, including DCs, macrophages, B cells, natural killer (NK) cells and T cells (p. 619). The state of the art questions whether "CpG-ODNs can be used in humans to inhibit the development of asthma? In vitro experiments have shown clearly that human cells react to CpG-DNA in a similar manner to lymphocytes from rodents.... The results obtained from animal models suggest that it is probable that these approaches might also be successful in humans to reduce the development of atopic disorders. However, treatments using CpG-ODNs rely both on innate and adaptive pro-inflammatory Th1 immune responses to inhibit Th2 responses. For this reason, harmful side effects of the treatment need to be ruled out. Besides potential problem of inducing strong inflammatory responses at the site of exposure to allergen, the use of CpG-DNA could also have other serious side effects. It has been reported that the application of CpG-ODNs can cause septic shock in mice. A further potential problem might be the development of autoimmune disease after application of CpG-DNA. Residual autoreactive T cells might become sufficiently activated to cause disease after encountering APCs that have been unspecifically activated by CpG-DNA." (p. 620, col. 2) Wohlleben et al teaches that all approaches that induce Th1 responses have the potential side effects of Th1-cell-mediated inflammation, potentially causing serious tissue damage (p. 624, col. 1). Kline et al 2002 (Am. J. Physiol. Lung Cell Mol. Physiol., 2002, 283:L170-L179; Kline et al, J. Immunol., 1998, 160:2555-2559) teaches that a single treatment of

CpG-ODN alone was ineffective in reducing the manifestations consistent with asthma in this animal model (p. L172, col. 2; see also p. L178, paragraph bridging cols. 1-2). Kline et al 2002 teaches that splenocytes from OVA-treated mice did not develop an antigen-specific Th1 phenotype. However, mice treated with CpG ODN and OVA had a marked shift toward a Th1 response to antigen as well as reduction in airway eosinophilia, serum IgE and bronchial hyperreactivity (p. L176, col. 2).

Weiner (J. Leukocytes Biology, 2000, 68:456-463) states furthermore that the molecular mechanisms of CpG oligonucleotides' immunostimulatory effects are not yet understood (see p. 461). And while the biological effects of some chemical modifications have been studied for CpG containing oligonucleotides, such as 2'-O-methyl modifications, phosphorothioate internucleotide linkages and 5-methyl cytosine substitutions, the incorporation and positioning of chemical modifications relative to the CpG dinucleotide are highly unpredictable (see Agrawal et al Molecular Med. Today, 2000, 6:72-81, especially on pp. 78-80; pages 31-32 of the instant specification).

Hussain et al 2004 also teaches that the "[C]ombined data from our studies with the murine model of allergic rhinitis and limited data from skin favor the idea that CpG ODN may be an attractive therapy in the treatment of acute atopic dermatitis. On the other hand, chronic AD skin has significantly fewer IL-4 and IL-13 mRNA-expressing cells but higher numbers of IL-5, GM-CSF, IL-12, and IFN-γ mRNA expression than has acute AD skin (Leung, 1999). For that reason, the long-term benefits of treatment with CpG ODN remain speculative." (see p. 27, col. 1).

Further, Satoh et al (Fukushima Igaku Zasshi, 2002, 52/3:237-250, abstract only) teaches that CpG-ODN is responsible for worsening of allergic contact dermatitis. "S.c. applied CpG ODN one day before sensitization of naïve mice significantly enhanced the ACD to DNFB which showed severe edema with massive CD8+ T cell infiltration." (abstract) Satoh et al also teaches that "[T]hese results indicate that CpG ODN vaccinations may elicit and aggravate side effects such as harmful CD8+ T cell-mediated type IV hypersensitivity responses." (abstract) Dziadzio et al (Handbook of Experimental Pharmacology, 2004, 161(Pharmacology and Therapeutics of Asthma and COPD):273-285, abstract only) teaches that "[V]arious combinations of plasmid DNA, immunostimulatory oligonucleotide (ISS-ODN), and proteins have been studied in murine models to evaluate the effectiveness of DNA vaccination. The success in skewing the immune response towards a Th1 phenotype in mice still needs to be evaluated in humans. The use of DNA vaccination as a treatment for allergic disease remains a

viable option for the future." (abstract) Metzger et al (J. Allergy Clin. Immunol., 1999, 104/2 Pt. 1:260-266) teaches that oligonucleotide therapy for asthma seems unlimited, but confirmation awaits the extension from animal models to human studies (abstract only).

Further, Van Uden et al (J. Allergy Clin. Immunol., 1999, 104:902-910) teaches that although "ISS are generally considered by researchers in this field to be modular 6-mer units, it has been difficult to determine the minimum stimulatory motif length. One study showed that a minimum length of 18 bases was required but that a length of 22 bases gave greater activity. Another study demonstrated good activity with a 15-mer ODN. Still another study used cationic lipid transfection to show a stimulatory effect with a 6-mer ODN." (p. 904, col. 1) Van Uden et al teaches that each ISS appears to have a different minimum length because crucial flanking bases would be variably distant from the core (p. 904, col. 2). Van Uden et al indicates that the ISS *may be a promising* method of treatment/prophylaxis for allergic disease, but that there are also come potential side effects that must be considered. The "immune system is delicately balanced between immunity and tolerance, between Thl and Th2, and between inflammation and unresponsiveness. There is always the possibility of unwanted effects of the powerful immune stimulation that ISS delivers." (p. 907, col. 2) LPS is similar to ISS, in view of this some of the same problems observed with LPS are potential problems with ISS (p. 907, col. 2). ISS could cause excessive local inflammation as seen with other powerful Thl adjuvants, such as CFA (p. 908, col. 1). The state of the art, taken as a whole, is still unpredictable with regard to the use of ISS-ODN in treating allergic asthma/asthma in an asthmatic subject (human or otherwise) in need of such treatment. Kussebi et al (Curr. Med. Chem.—Anti-Inflammatory & Anti-Allergy Agents, 2003, 2:297-308) teaches that, "[I]n general, the direct conjugation of CpG-ODNs to allergenic proteins or peptides was more effective than their co-administration (citation omitted), possibly because of enhanced interaction with dendritic cells via the CpG moiety (citation omitted)." (p. 300, col. 1) The state of the art is unclear regarding the use (concentrations, composition (linked or unlinked to antigen), formulations, modes of administration, number of dosages, etc) of these CpG.

The amount of direction or guidance presented in the specification and the absence of working examples is a hindrance to practicing the claimed invention. Applicants have not provided guidance in the specification toward the claimed methods. One skilled in the art would not accept on its face in view of the lack of examples given in the specification as being representative of a successful claimed method in view of the lack of guidance in the specification and the known

unpredictability associated with the ability to predict the biological effects exerted by administering any immunostimulatory oligonucleotide and antigen to a subject. The specification as filed fails to provide particular guidance which resolves the known unpredictability in the art associated with effects of CpG or any immunostimulatory oligonucleotide. The quantity of experimentation required to practice the invention as claimed would require the de novo determination of accessible target sites, modes of delivery and formulations of the claimed oligonucleotide. Since the specification fails to provide particular guidance for the claimed method and the art teaches that this is not yet possible (i.e. highly unpredictable), it would require undue experimentation to practice the invention as presently claimed.

The rejection is maintained for the reasons of record. Applicant's arguments filed January 11, 2006 have been fully considered but they are not persuasive. Applicants have asserted that working examples are not necessary for enablement and that there are numerous working examples in the specification, including data in Tables 1-3 that establishes that unmethylated CpG is responsible for the immune stimulation. Applicants have also stated that Example 5 was performed and that the data was described in the specification at p. 17, l. 9-24. The Examiner appreciates Applicants pointing out specific descriptions and data; however, these examples do not enable the scope of the very broad genus of any and all immunostimulatory oligonucleotides and any and all vaccines as presently claimed invention.

Applicants have asserted that the key conclusions of Threadgill et al have been refuted by other investigators. Applicants have also asserted that post filing references may be used by Applicant to rebut the Examiner's assertions that the invention was unpredictable by demonstrating that the claimed invention is functional as described by Applicant in the patent application. However, claimed invention must be enabled as of the filing date of the patent application, not enabled by publications post filing. Whether the specification would have been enabling as of the filing date involves consideration of the nature of the invention, the state of the prior art, and the level of skill in the art. The initial inquiry is into the nature of the invention, i.e., the subject matter to which the claimed invention pertains. The nature of the invention becomes the backdrop to determine the state of the art and the level of skill possessed by one skilled in the art.

The state of the prior art is what one skilled in the art would have known, at the time the application was filed, about the subject matter to which the claimed invention pertains. The relative skill of those in the art refers to the skill of those in the art in relation to the subject matter to which the claimed invention pertains at the time the application was filed. See MPEP § 2164.05(b).

The state of the prior art provides evidence for the degree of predictability in the art and is related to the amount of direction or guidance needed in the specification as filed to meet the enablement requirement. The state of the prior art is also related to the need for working examples in the specification.

The state of the art for a given technology is not static in time. It is entirely possible that a disclosure filed on January 2, 1990, would not have been enabled. However, if the same disclosure had been filed on January 2, 1996, it might have enabled the claims. Therefore, the state of the prior art must be evaluated for each

application based on its filing date. 35 U.S.C. 112 requires the specification to be enabling only to a person "skilled in the art to which it pertains, or with which it is most nearly connected." In general, the pertinent art should be defined in terms of the problem to be solved rather than in terms of the technology area, industry, trade, etc. for which the invention is used.

The specification need not disclose what is well-known to those skilled in the art and preferably omits that which is well-known to those skilled and already available to the public. In re Buchner, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); Hybritech, Inc. v. Monoclonal Antibodies , Inc ., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984).

The state of the art existing at the filing date of the application is used to determine whether a particular disclosure is enabling as of the filing date. > Chiron Corp. v. Genentech Inc., 363 F.3d 1247, 1254, 70 USPQ2d 1321, 1325-26 (Fed. Cir. 2004) ("a patent document cannot enable technology that arises after the date of application").< Publications dated after the filing date providing information publicly first disclosed after the filing date generally cannot be used to show what was known at the time of filing. In re Gunn, 537 F.2d 1123, 1128, 190 USPQ 402,405-06 (CCPA 1976); In re Budnick, 537 F.2d 535, 538, 190 USPQ 422, 424 (CCPA 1976) (In general, if an applicant seeks to use a patent to prove the state of the art for the purpose of the enablement requirement, the patent must have an issue date earlier than the effective filing date of the application.). While a later dated publication cannot supplement an insufficient disclosure in a prior dated

application to make it enabling, applicant can offer the testimony of an expert based on the publication as evidence of the level of skill in the art at the time the application was filed. Gould v. Quigg, 822 F.2d 1074, 1077, 3 USPQ2d 1302, 1304 (Fed. Cir. 1987). In general, the examiner should not use post-filing date references to demonstrate that the patent is non-enabling. Exceptions to this rule could occur if a later-dated reference provides evidence of what one skilled in the art would have known on or before the effective filing date of the patent application. In re Hogan, 559 F.2d 595, 605, 194 USPQ 527, 537 (CCPA 1977). If individuals of skill in the art state that a particular invention is not possible years after the filing date, that would be evidence that the disclosed invention was not possible at the time of filing and should be considered. In In re Wright, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513-14 (Fed. Cir. 1993) an article published 5 years after the filing date of the application adequately supported the examiner's position that the physiological activity of certain viruses was sufficiently unpredictable so that a person skilled in the art would not have believed that the success with one virus and one animal could be extrapolated successfully to all viruses with all living organisms. Claims not directed to the specific virus and the specific animal were held nonenabled.

Further, the presence of inoperative embodiments within the scope of a claim does not necessarily render a claim nonenabled. The standard is whether a skilled person could determine which embodiments that were conceived, but not yet made, would be inoperative or operative with expenditure of no more effort than is normally required in the art. Atlas Powder Co. v. E.I. du Pont de Nemours & Co., 750 F.2d 1569, 1577, 224 USPQ 409, 414 (Fed. Cir. 1984) (prophetic examples do not make the disclosure nonenabling). Although, typically,

inoperative embodiments are excluded by language in a claim (e.g., preamble), the scope of the claim may still not be enabled where undue experimentation is involved in determining those embodiments that are operable. A disclosure of a large number of operable embodiments and the identification of a single inoperative embodiment did not render a claim broader than the enabled scope because undue experimentation was not involved in determining those embodiments that were operable. In re Angstadt, 537 F.2d 498, 502-503, 190 USPQ 214, 218 (CCPA 1976). However, claims reading on significant numbers of inoperative embodiments would render claims nonenabled when the specification does not clearly identify the operative embodiments and undue experimentation is involved in determining those that are operative. Atlas Powder Co. v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 1577, 224 USPQ 409, 414 (Fed. Cir. 1984); In re Cook, 439 F.2d 730, 735, 169 USPQ 298, 302 (CCPA 1971). The scope of the pending claims is the stimulation of a subject's response to any vaccine (vaccines against any and all bacterial infections, viral infections, parasitic infections, as well as cancers and tumors) comprising administering any immunostimulatory oligonucleotides to the subject. Further, it is not clear from the claims is an antigen is actually administered with the immunostimulatory oligonucleotides.

Applicants have asserted that McCluskie et al is an article describing DNA vaccines against Hepatitis B virus. On page 296, the page identified by the examiner, the reference mentions that one of the factors involved in influencing the Th bias of the response to DNA vaccines is the presence of CpG motifs. The reference is not relevant to the enablement of the pending claims because the pending claims do not encompass plasmid vectors (or DNA vaccines). The pending independent claims are directed to the use of oligonucleotides. The issues

of predictability and therapeutic effectivity are very different for CpG oligo-nucleotides and DNA vaccines. However, the claims do not recite that any kind of protein or antigen was added in the composition of the CpG immunostimulatory nucleic acid being administered; the claims do not specifically exclude plasmids, vectors or DNA vaccines. The immunostimulatory nucleic acid could read on the whole bacteria, or the immunostimulatory nucleic acid could be part of a DNA vaccine; the claims just recite an immunostimulatory oligonucleotide comprising....

Applicants have asserted that each of the references (Threadgill et al 1998, Krieg et al 2000, Wohlleben et al 2001, Kline et al 2002, Kline et al 1998, Weiner et al 2000, Agrawal et al 2000, Satoh et al 2002, Dziadzio et al 2004, Barnes 2000, Van Uden et al 1999 and Kussebi et al 2003) cited to show that the state of the art is unpredictable with regard to the claimed method actually shows promise, may be a promising, probable successful use in humans, potential and/or suggestion of the claimed invention and its enablement. It is noted that even though these references may suggest the possibility if CpG's usefulness as a vaccine adjuvant, they still also indicate even several years after Applicants' effective filing date that the scope of the claimed method is not enabled.

Applicants have asserted that several Phase I and II studies have been performed in humans to date. In particular subcutaneous administration, like that in the Satoh reference, has been performed in humans for a cancer trial. Applicants have asserted that the data are described in Kim et al 2004 abstract. Both have been cited to demonstrate that CpG oligonucleotides have been safely administered to humans and that they were well tolerated. Again, these are results and evidence available after Applicants' effective filing date and it is not clear that

these Phase I and II studies were performed in the same manner as set forth in the specification. Applicants have listed numerous references (see pages 15-16 of the January 11, 2006 amendment) to show that the CpG is well tolerated in humans as well as the efficacy of the CpG in stimulating immune responses in such subjects. However, none of these references have been provided and they are all post filing.

4. Claims 37 and 46-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Tokunga et al (EP 468520 A2).

Tokunga et al discloses an immunostimulatory oligonucleotide of 10-100 bases having a specific formula that shows strong immunostimulatory activity (abstract). The prior art discloses immunostimulatory remedies capable of arresting and curing susceptible to medicines having immunopharmacological activity (p. 2). Tokunga et al discloses oligonucleotides comprising the AACGTT sequence (elected species) (see p. 3). Tokunga et al discloses that the immunostimulatory remedies can be used alone or in combination with other therapeutic means against such diseases the outbreak of which can be suppressed, or the progress of which can be arrested or delayed, by the functions of the immune system and lists numerous diseases and conditions (p. 4). The examples disclose method of administering the CpG to a subject and administering the CpG and an antigen to a subject (see examples).

The prior art discloses the claimed invention. Since the Patent Office does not have the facilities for examining and comparing applicants' methods with the methods of the prior art reference, the burden is upon applicants to show a distinction between the material structural and functional characteristics of the

claimed methods and the methods of the prior art. See In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and In re Fitzgerald et al., 205 USPQ 594.

The rejection is maintained for the reasons of record. Applicant's arguments filed ***July 11, 2005*** have been fully considered but they are not persuasive. Applicants do not agree with the assertion that Tokunaga et al discloses the claimed invention, in particular the immunostimulatory oligonucleotide adjuvant. Applicants further assert that there are not examples of the administration of a composition comprising the oligonucleotide and an antigen as required by the claimed method. However, the components of the composition that Applicants' claimed method administers to the subject is present in the composition disclosed by Tokunaga et al (immunostimulatory oligonucleotide and antigen) and the art discloses that same reasons for administration of the composition; see pp. 4-5 of Tokunaga et al. It is noted that the prior art may not specifically recite the word "adjuvant"; however the art discloses that the immunostimulatory oligonucleotides are immunopotentiators. On-line Medical Dictionary and Stedman' Medical Dictionary define an immunopotentiator as any of a wide variety of specific or non-specific substances which on inoculation enhances or augments an immune response. Further, Dorlands Medical Dictionary defines an immunopotentiator as an agent that specifically or non-specifically enhances or augments the immune response, such as an adjuvant. Therefore, it would appear that the oligonucleotides disclosed in Tokunaga et al are immunostimulatory oligonucleotide adjuvants.

The rejection is maintained for the reasons of record. Applicants have not set forth any new arguments or evidence with regard to this rejection.

5. It is noted that Applicants have numerous patent applications claiming various compositions and methods using the immunostimulatory oligonucleotides of the presently claimed invention. The Examiner requests that Applicants identify those pending applications that are related to the claimed invention and having pending related claims in order to avoid ODP situations.

6. No claims are allowed.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. M. Minnifield whose telephone number is 571-272-0860. The examiner can normally be reached on M-F (8:00-5:30) Second Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynette R.F. Smith can be reached on 571-272-0864. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

N. M. Minnifield
Primary Examiner
Art Unit 1645

NMM
April 19, 2006